



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,203	09/29/2003	Nicholas I. Buchan	HSJ920030156US1	9945
32112	7590	07/27/2006	EXAMINER	
INTELLECTUAL PROPERTY LAW OFFICES			GEORGE, PATRICIA ANN	
1901 S. BASCOM AVENUE, SUITE 660			ART UNIT	
CAMPBELL, CA 95008			PAPER NUMBER	

1765  
DATE MAILED: 07/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/675,203

Applicant(s)

BUCHAN ET AL.

Examiner

Patricia A. George

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 6 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 May 2006.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 6-14 and 16-20 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-4, 6-14, 16-20 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

***Response to Amendment***

The amendment filed on 5/2/06 has been entered, per agreement in interview of 7/11/06.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 and are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 and 18 recites the limitation "first sputter etching away said seed layer of RIE-resistant material before RIE" in lines 3 and 4. Examiner interprets the term "seed layer" to reference a layer which is deposited before the bulk of the layer it is seeding. Examiner fails to understand how a seed layer can be removed prior to the bulk of the material that overlies it. There is insufficient antecedent basis for this limitation in the claim.

Examiner fails to understand how one could remove the seed layer of the RIE resistant material, prior to RIE, as the limitations in claims 8 and 18, when the limitation of claim 1 and 11 recite that the RIE resistant material is RIE etched through the material as in claim 1 and 11. Is examiner to understand that by removing the seed layer, as in the limitation of claim 8 and 18, there would be anything left of the RIE resistant material to etch through, as in claim 1 or 11? For the sake of examination

Art Unit: 1765

examiner will interpret the claim limitation to read - - first sputter etch away the seed layer of the RIE resistant material before DRIE. - -

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, and 11-14 are rejected under 35 U.S.C. 103(a) as being obvious over Bunch et al. (6,776,690) in view of Lott et al. (4,965,702), Penning (7,027,269) and Gopinath et al. (6,989,331).

As for claims 1 and 11, Bunch discloses a method for fabricating recording head sliders made from silicon substrates (col. 3, l.67) using both NiFe and Alumina as DRIE resistant materials, used to DRIE through Al<sub>2</sub>O<sub>3</sub> to cut Si wafer into pieces (col. 4, l.25-28).

Bunch et al. teaches depositing a layer of Al<sub>2</sub>O<sub>3</sub> as the DRIE mask (col.4, l.3-4). Bunch et al. teaches non-RIE-able material may also be used to define the shape of the structure (col. 4, l. 7) and that a transitional metal is RIE-resistant and an upper layer of

material (i.e. on the alumina) (col.4, l. 44-47) used as part of the mask, because it is not etchable in a DRIE process (col.4, l.35-50).

Bunch et al. is silent as to etching by RIE through transitional metal to pattern the dielectric layers.

Lott et al. (4,965,702) teaches use of electrolytically plated metal layers, in form of separate masks or exposed wiring lines, used to mask dielectrics in plasma etching because the etch rate of the dielectric is faster and the metal is substantially unaffected by the plasma (col.4-5, lines 47-15). Although, Lott et al. does not explicitly state the plasma etch of the dielectric is reactive ion etching, Lott does not limit the type of plasma etching.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made, to select RIE to pattern the dielectric layers through the metal mask, as in applicants' claimed limitation, because Bunch does not limit the type of etching used and RIE is known to be effective for etching dielectric materials, Lott et al. teaches using metal as a mask for dielectrics is beneficial because the dielectric etches faster and the metal is substantially unaffected by the plasma (col.4-5, lines 47-15).

Bunch et al. does not teach removing the primary mask or secondary masks which will expose the under layer.

Gopinath et al. (6,989,331) teaches "when the etch for which the hard mask has been formed is completed, it is typically desirable to remove the hard mask" (see col.1, 48-50) which will expose the under layer (see col. 2-3).

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to remove any hard masked once it has been used, thereby exposing the under layer, as in applicants' limitation of claim 1, because the function of the material has been utilized and Gopinath et al. teaches it is known to be desirable.

Bunch et al. does not teach silicon substrates for fabricating sliders has a SiO<sub>2</sub> overcoat.

Penning et al. teaches methods of fabrication for magnetic head, including it is well known that the substrate of the wafer is silicon and on top of the silicon is an oxide, such as SiO<sub>2</sub> (col.4, l.3-42).

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to include that the layer on top of the silicon substrate is an oxide, such as SiO<sub>2</sub>, as in Penning et al., when fabricating recording head sliders, as Bunch et al., because Penning teaches SiO<sub>2</sub> is preferred because it can be effected by selective etching.

As to claim 2, and 12, see discussion above.

With respect to claim 3, and 13, see discussion above.

As to claim 4, and 14, see discussion above.

***Claim Rejections - 35 USC § 103***

Claims 6, 7, 9, 16, 17, and 19 are rejected under 35 U.S.C. 103(a) as being obvious over Bunch et al., Lott et al., Penning et al., and Gopinath et al., as applied to claims 1-4 above, in view of Bonin et al (6,459,260).

Bunch et al. teaches electrolytically plated metal layers, but fails to teach apply a seed layer of material; prior to exposing and developing photoresist to create a pattern; plating the metal into the photo-resist pattern; and stripping the photo-resist as in claims 6, 7, 16, and 17.

As to claims 6, 7, 16, and 17, Bonin et al. teaches it is known to apply a seed layer of material; prior to exposing and developing photoresist to create a pattern; plating the metal into the photo-resist pattern; and stripping the photo-resist as in claims 6, 7, 16, and 17.

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to include the use of a seed layer, as Bonin et al., when plating a patterned material, as in Lott et al., when fabricating recording head sliders, as Bunch et al., because seed layers enhance adhesion by providing structural texture which promotes the alignment of layers.

Bunch et al. is silent as to the selective removal of the plated metal primary mask, by wet etch, as in claims 9 and 19.

Bonin et al. teaches metal plated material (i.e. primary mask) may be removed (i.e. selectively) by wet etching, as in claims 9 and 19 (see col. 7, l. 50-53).

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to include the process of selectively etching the plated metal mask with wet etch, as Bonin et al., when fabricating recording head sliders, as Bunch et al., because Bonin et al. teaches it is method known to be functional for removal of the material.

### ***Claim Rejections - 35 USC § 103***

Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being obvious over Bunch et al., Lott et al., Penning et al., Gopinath et al., and Bonin et al (6,459,260) in view of Shue et al. (6,686,280).

The combined teaching of Bunch et al. fails to teach the metal layer is removed prior to DRIE, as in claims 8 and 18 (see discussion toward claim 8, above).

Shue et al. teaches it is known and conventional to sputter etch away a seed layer (see abstract).

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to modify the invention of for fabricating recording head sliders, as Bunch, by including a step to sputter etch away a seed layer, as Shue et al. because Shue et al. teaches removing the seed layer provides the benefit of removing unwanted materials which lie over the seed layer.



***Claim Rejections - 35 USC § 103***

Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being obvious over Bunch et al., Lott et al., Penning et al., Gopinath et al., in view of JP 60254731 A.

The modified invention of Bunch et al. fails to teach the limitations of claims 10 and 20.

JP 60254731 A teaches it is known and conventional to remove alumina by selective wet etching (see title).

It would have been obvious to one of ordinary skill in the art at the time of invention was made, to modify the invention of for fabricating recording head sliders, as Bunch, by including a step of removing alumina by selective wet etching, as JP 60254731 A, because JP 60254731 A teaches wet etching will perfectly eliminates the alumina resulting with a structure that is desired.

***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia (Patty) George whose telephone number is (571) 272-5955. The examiner can normally be reached on weekdays between 7:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1765

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
PAG  
07/06

  
SHAMIM AHMED  
PRIMARY EXAMINER